

The Acute Effects of Pre-Event Lower Limb Massage on Some Selected Physical Fitness Components of Junior Male Soccer Trainees of Ethiopian Youth Sport Academy

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Abstract

Objectives: To examine the acute effects of pre-event warm-up modalities on some selected physical fitness components of junior male soccer trainees of the Ethiopian youth sport academy. **Design:** Experimental study design was employed. **Methods:** Thirty three (33) junior soccer trainees were included as a subject using purposive and availability sampling technique. Quantitative method of data analysis both descriptive statistics and inferential statistics was used. The descriptive statistics was presented as a form of central tendency which is mean and variability (standard deviation). The inferential statistics was parametric test which are dependent t-test (Paired sample t-tests) to show the significant difference of explosive power, speed, agility and flexibility performance following the three conditions. **Result:** The result can show that the mean value of the trainees explosive power test after traditional, pre-event massage and combined warm-up protocols were 2.27m, 2.23m and 2.23m respectively. The mean value of the trainees speed test after traditional, pre-event massage and combined warm-up protocols were 4.15s, 4.40s and 4.13s respectively. The mean value of the trainees agility test after traditional, pre-event massage and combined warm-up protocols were 15.83s, 16.35s and 15.74s respectively. The mean value of the trainees sit and reach test after traditional, pre-event massage and combined warm-up protocols were 12.85cm, 14.58cm and 15.18 respectively. **Conclusion:** significant difference were observed between pre-test (Traditional Warm up) and the other warm up modalities (pre-event lower limb massage and the combination of pre-event lower limb massage with traditional warm-up) on standing broad jump test, 30m speed test, Illinois agility test and sit & reach test at $P < 0.05$. However, insignificant results have been found between pre-test (Traditional warm up) and the combination of pre-event lower limb massage with traditional warm-up on 30m speed test. Therefore, coaches and athletes to use the combined warm up protocol which pre-event lower limb massage first then traditional warm-up

Keywords: Pre-Event, Massage, warm-up, performance, traditional warm up

1. Introduction

Warm-up is practiced by athletes to increase their physiological and psychological capacities prior to training or competition, despite limited scientific evidence supporting one protocol over another (ACSM, 2006; Faigenbaum *et al.*, 2005; O'Brien *et al.*, 1997; Robergs *et al.*, 1991).

Different types, intensity and duration of warm-up ensure different physiological, biochemical and psychological changes in the body (Bishop, 2003a; 2003b; Mitchell and Huston, 1993; O'Brien *et al.*, 1997). Traditionally, athletes perform static stretching after initial jogging during warm-up because it is easy, safe, and believed to be less likely to strain the muscles than other types of stretching (Alter, 1997; Hedrick, 2002; Koch *et al.*, 2003; Young and Behm, 2002).

To date, very few studies have examined the effects of pre-event massage on performance. There are controversial claims in the sports literature that pre-event massage can increase or decrease performance (Weerapong *et al.*, 2005). Wiktorsson-Moller *et al.* (1983) found that 6-15 minutes of petrissage, with the aim of promoting relaxation and comfort, reduced muscle strength. Goodwin *et al.*, 2007 found that a controlled 15 minute lower limb massage administered prior to warm-up had no significant effect on sprint performance. Research conducted by Hunter *et al.*, 2006 showed that lower limb massage appears to produce a reduction in force during the first contraction of muscles. Two studies found that massage of the hamstring muscle group increased the passive range of motion in hip and lower limb joints (Crosman *et al.*, 1984; Wiktorsson-Moeller *et al.*, 1983; McKechnie *et al.*, 2007). Moreover, there is no consensus on the type, style, application, duration, intensity, number of strokes applied, or the time of application prior to training or competition (Caldwell, 2001, King, 1993, Paine, 2000).

The above mentioned studies did not examine the acute effects of pre-event warm-up modalities such as lower limb massage, traditional warm-up and the combination of massage with traditional warm-up and they did not compare their results. Furthermore, studies have not been conducted so far on the subject in Ethiopia. Therefore, this study was investigate the acute effects of pre-event warm-up modalities such as lower limb massage, traditional warm-up and the combination of massage with a traditional warm-up on some selected physical fitness components such as explosive power, speed, agility and flexibility and this study may be served as baseline

information for future intervention program.

2. Methods

For this study experimental design was used, because the participants were tested than one test. Junior soccer players, with a minimum training/playing background of 3 sessions per week, have been assigned. The study takes place in the Ethiopian youth sport academy, which is found in the capital of Ethiopia (Addis Ababa).

For this research availability and purposive sampling techniques were used because of the small number of the subjects in Ethiopian youth sport academy. Thirty-three male junior soccer trainees were included as a subject according to the inclusion and exclusion criteria. The participants were used the anthropometric measurements includes Age, sex, weight, height, body mass index (BMI) and performance tests includes explosive power, speed, agility and flexibility performance measurements after pre-event lower limb massage, traditional warm-up and pre-event lower limb massage with traditional warm-up.

All of the selected participants were included as subjects who are junior male soccer trainees and who, having football training in Ethiopian youth sport academy. In addition to this have sunburn, skin rashes or conditions, open sores, fractures, contusions, hematomas, thrombophlebitis, acute pain or injury and fever or infections were not included as participants in this research study.

Permission was obtained from the director of Ethiopian youth sport academy. The purpose of the study was explained to the study participants in order to get informed verbal consent. The privacy of the participants was guaranteed in risk of any harm. A written consent was read to each participant to obtain their agreement. Then verbal consent was received from each study subjects and anyone who was not willing to take part in the study has full right to do so.

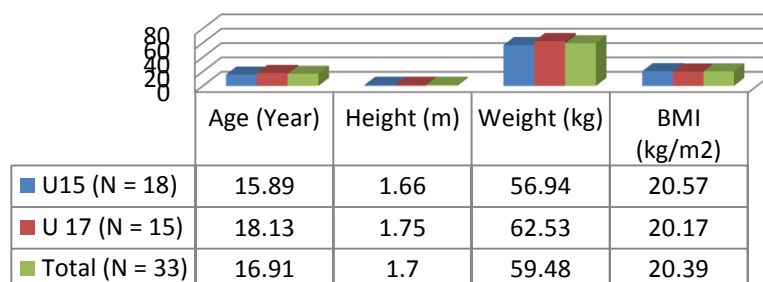
Quantitative data was used through the appropriate anthropometric test includes age, sex, weight, height, body mass index (BMI) to know the characteristics of the study participants and performance tests includes explosive power (Hede *et al.* 2011), speed, agility and flexibility (Duthie *et al.*, 2006; Moir *et al.*, 2004) performance measurements following the three discrete warm-up modalities, consisting of pre-event lower limb massage, traditional warm-up, and pre-event lower limb massage combined with traditional warm-up from Ethiopian youth sport academy.

For this study a quantitative data analysis both descriptive statistics and inferential statistics was used. The descriptive statistics was used to analyze the anthropometric and selected physical fitness variables; it was presented as a form of central tendency which is mean and variability (standard deviation). The inferential statistics was used to analyze the results of explosive power, speed, agility and flexibility performance following the pre-event lower limb massage and the combined warm up protocols using parametric tests which are dependent t-test (Paired sample t-tests) to show the significant difference between the pre-test (traditional warm-up) and the remaining warm-up modalities (pre-event lower limb massage and the combined warm up protocols). The significance level will be set at $P < 0.05$ for each of the statistical tests. SPSS 20 version software will be used for the statistical analysis.

3. Results

In this study a total of thirty three junior male soccer trainees were participated. Among them eighteen were under 15 soccer trainees and the remaining fifteen were under 17 soccer trainees. The mean and SD values the U15 and U17 soccer trainees age in year was 15.89 ± 0.47 and 18.13 ± 0.51 years old respectively.

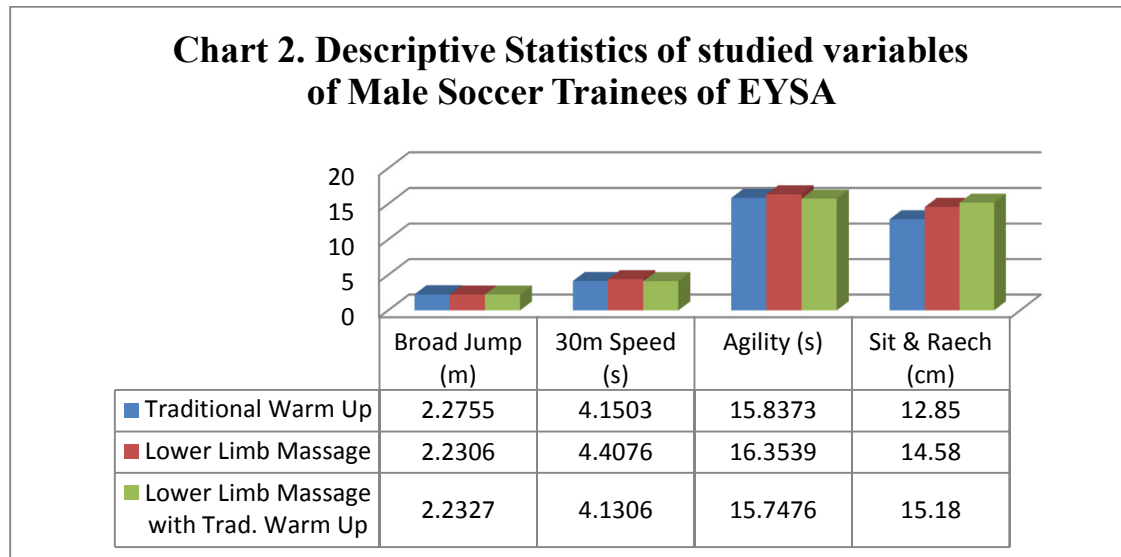
Chart 1. Descriptive statistics of characteristics of the study subjects



The above chart show that the mean value of anthropometric characteristics in U15 and U17 soccer trainees of Ethiopian youth sport academy. As indicated in chart the mean \pm SD value of U15 and U17 soccer trainees height in meter was 1.66 ± 0.04 and 1.75 ± 0.07 meter respectively. And again from the table the mean \pm SD value of U15 and U17 soccer trainees weight in kg was 56.94 ± 4.62 and 62.53 ± 4.99 kg respectively. The

table 1 also shows that mean \pm SD value of U15 and U17 soccer trainees BMI in kg/m² was 20.57 \pm 1.40 and 20.17 \pm 0.92 kg/m² respectively.

This indicates that Ethiopian youth sport academy U15 and U17 soccer trainees were in normal BMI as compared with the normal range of 18.5-24.9 gk/m² of BMI. Regarding with this as reported by Position of the American Dietetic Association and the Canadian Dietetic Association (1993), BMI can influence athlete's speed, endurance and power, whereas body composition can affect soccer player's strength and agility positively.



The above chart 2 the mean value of broad jump test in different warm up protocols such as traditional warm up, pre-event lower limb massage and the combined warm-up protocols were 2.2755m, 2.2306m and 2.2327m respectively.

As presented in the above chart 2 the mean value of 30m speed test in different warm up protocols such as traditional warm up, pre-event lower limb massage and combined warm-ups protocols were 4.1503sec, 4.4076sec and 4.1306sec respectively.

The mean value of Illinois agility test in different warm up protocols such as traditional warm up, pre-event lower limb massage and the combined warm-up protocols were 15.8373sec, 16.3539sec and 15.7476sec respectively.

The above chart 2 also show that the mean value of sit and reach test in different warm up protocols such as traditional warm up, pre-event lower limb massage and the combined warm-up protocols were 12.85cm, 14.58cm and 15.18cm respectively.

Table 1. Paired Samples Test of Male Soccer Trainees									
Variables	Treatments	Paired Differences					t	df	Sig. (2-tailed)
		Mean ± Std. Deviation	Mean Diff.	Std. Error Mean	95% Confidence Interval of the Diff.				
					Lower	Upper			
Explosive Power (Broad Jump Test (m))	Traditional Warm Up	2.2755±0.17	0.0448	0.01466	0.0150	0.0747	3.060	32	0.004
	Lower Limb Massage	2.2306±0.20							
	Traditional Warm Up	2.2755±0.17	0.0427	0.01081	0.0207	0.0647	3.952	32	0.000
	Lower Limb Massage with Trad. Warm Up	2.2327±0.19							
	Lower Limb Massage	2.2306±0.20	0.0021	0.01811	0.039	0.03476	0.117	32	0.907
	Lower Limb Massage with Trad. Warm Up	2.2327±0.19							
Speed (30m Speed Test (s))	Traditional Warm Up	4.1503±0.25	-0.25727	0.05112	-0.3614	-0.15314	-5.033	32	0.000
	Lower Limb Massage	4.4076±0.25							
	Traditional Warm Up	4.1503±0.25	0.01970	0.01731	-0.0155	0.05496	1.138	32	0.264
	Lower Limb Massage with Trad. Warm Up	4.1306±0.22							
	Lower Limb Massage	4.4076±0.25	0.27697	0.04798	0.17924	0.37470	5.773	32	0.000
	Lower Limb Massage with Trad. Warm Up	4.1306±0.22							
Agility (Illinois Agility Test (s))	Traditional Warm Up	15.8373±0.79	-0.5166	0.12124	-0.7636	-0.26970	-4.261	32	0.000
	Lower Limb Massage	16.3539±0.70							
	Traditional Warm Up	15.8373±0.79	0.0897	0.03925	0.00976	0.16964	2.286	32	0.029
	Lower Limb Massage with Trad. Warm Up	15.7476±0.78							
	Lower Limb Massage	16.3539±0.70	0.6063	0.10947	0.38338	0.82934	5.539	32	0.000
	Lower Limb Massage with Trad. Warm Up	15.7476±0.78							
Flexibility (Sit and Reach Test (cm))	Traditional Warm Up	12.85±4.85	-1.727	0.362	-2.465	-0.989	-4.769	32	0.000
	Lower Limb Massage	14.58±5.23							
	Traditional Warm Up	12.85±4.85	-2.33	0.480	-3.311	-1.356	-4.861	32	0.000
	Lower Limb Massage with Trad. Warm Up	15.18±5.22							
	Lower Limb Massage	14.58±5.23	-0.6	0.168	-0.949	-0.263	-3.603	32	0.001
	Lower Limb Massage with Trad. Warm Up	15.18±5.22							

The above table can show the mean value of the trainees explosive power test after traditional, pre-event massage and combined warm-up protocols were 2.27m, 2.23m and 2.23m respectively. The mean value of the trainees speed test after traditional, pre-event massage and combined warm-up protocols were 4.15s, 4.40s and 4.13s respectively. The mean value of the trainees agility test after traditional, pre-event massage and combined warm-up protocols were 15.83s, 16.35s and 15.74s respectively. The mean value of the trainees sit and reach test after traditional, pre-event massage and combined warm-up protocols were 12.85cm, 14.58cm and 15.18 respectively.

The result showed in the above table revealed that significant difference were observed between pre-test (Traditional Warm up) and the other warm up modalities (pre-event lower limb massage and the combination of pre-event lower limb massage with traditional warm-up) on standing broad jump test, 30m speed test, Illinois agility test and sit & reach test at $P < 0.05$. However, insignificant results have been found between pre-test (Traditional warm up) and the combination of pre-event lower limb massage with traditional warm-up on 30m speed test. Besides of this the trainees show a better mean difference after pre-test (Traditional warm up) on Standing Broad jump test, however the combination of pre-event lower limb massage with traditional warm-up revealed a better mean difference in 30m speed test, Illinois agility test and sit & reach tests.

4. Discussion

Traditionally, athletes perform a warm-up session prior to physical activity or competition. The aim of the warm-up is to improve the physiological, biomechanical and psychological performance of the athlete. However, coaches, athletic trainers, athletes, and sport scientists have not yet determined which warm-up protocol is the best. Generally, coaches and athletes apply jogging and static stretching during the warm-up session.

Apart from traditional warm up (stretching), pre-event massage can be used as an adjunct to physical warm-up (Tessier, 2005). To date, very few studies have examined the effects of pre-event massage on performance. There are controversial claims in the sports literature that pre-event massage can increase or decrease

performance (Weerapong *et al.*, 2005). However, the results of the current study (pre-event lower limb massage) can show significant increases of performance in sit & reach test. Similar with these, studies found that massage of the hamstring muscle group increased the passive range of motion in hip and lower limb joints (Crosmann *et al.*, 1984; McKechine *et al.*, 2007). And also the results of pre-event lower limb massage can show significant degraded of performance in standing broad jump test, speed test and agility test. Similarly, Goodwin *et al.* (2007) found that a controlled 15 minute lower limb massage administered prior to warm-up had no significant effect on sprint performance. And research conducted by Hunter *et al.* (2006) showed that lower limb massage appears to produce a reduction in force during the first contraction of muscles.

In an attempt to further elucidate the optimal pre-participation protocols for activities, the new approach in this study was to examine the effects of the combination of pre-performance lower limb massage with traditional warm up warm-up on explosive, speed, agility and flexibility. The findings of the present study showed that significant increases of performance in speed test, agility test and sit & reach test. And also the finding can showed significantly degraded performance on standing broad jump test. The result of the present study is in contrast, with the previous study which examined the use of massage in pre-event after warm-up (Arabaci, 2008). Arabaci (2008) found that 10 min posterior and 5 min anterior lower limb Swedish massage after a warm-up session significantly degrades the performance of explosive, speed, and agility tests and significantly increased flexibility of the hip joint (sit & reach test).

The current study results in traditional warm up showed significantly degraded performance on sit and reach test. Similar with this, studies have shown that pre-event traditional warm up (static stretching) (particularly increasing the stretching duration) decreases the performance of acute explosive, speed and power exercises (Church *et al.*, 2001; Fowles *et al.*, 2000; Young and Behm, 2002; 2003; Kokkonen *et al.*, 1998). In contrast, traditional warm up showed significant increases of the performance on standing broad jump test, speed test as compared with lower limb massage, and agility test as compared with lower limb massage.

5. Conclusion

Based on the major findings of the study, the acute effects of warm-up modalities on some selected physical fitness components the following points are stated as conclusion. Pre-event lower limb massage warm-up method led to degrades the performance of standing broad jump, 30m speed and Illinois agility tests. In contrast, pre-event lower limb massage warm-up method increased in flexibility of the hip joint (sit & reach test). The combined warm-up protocols (pre-event lower limb massage with traditional warm-up) has no effect on explosive power (Broad Jump test), while it had a positive effect on speed (30m sprint test), agility (Illinois agility test) and flexibility (sit and reach test) performance. Traditional warm up protocol has also a positive effect on explosive power (Broad Jump test), 30m sprint test and Illinois agility test performance but not in flexibility test.

According to the present results, massage should not be recommended for warm-ups separately. It is recommended that, coaches and athletes to use the combined warm up protocol which pre-event lower limb massage first then traditional warm-up. It is highly expected from sport professionals, coaches and related fields professionals to guide and educate on the importance and the acute effects of warm-up protocols for performance efficiency. Further studies should examine the effectiveness of shorter duration and various types and frequencies of massage manipulations for their utility immediately prior to activities.

6. Practical implications

- ✚ The pre-test was taken after traditional warm-up (walking, jogging, running and static stretching) through performance tests which includes; explosive power, speed, agility and flexibility.
- ✚ The players were treated with the second warm-up modality which is pre-event lower limb massage and the players takes performance tests which includes; explosive power, speed, agility and flexibility.
- ✚ The third warm-up modality was applied on the players which is the combination of pre-event lower limb massage with traditional warm-up and then the players takes performance tests again which includes; explosive power, speed, agility and flexibility.

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